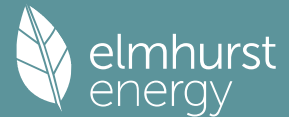


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Property Reference	Venton				Issued on Date	12/06/2025
Assessment Reference	Planning	Prop Type Ref		Planning		
Property	New dwelling, Land west of Venton, Green Acres, Lilley, LU2 8LS					
SAP Rating	84 B	DER	3.07	TER	8.61	
Environmental	97 A	% DER < TER				64.34
CO ₂ Emissions (t/year)	0.59	DFEE	41.65	TFEE	43.04	
Compliance Check	See BREL	% DFEE < TFEE				3.25
% DPER < TPER	30.58	DPER	31.58	TPER	45.49	
Assessor Details	Ms. Natalie Wheeler				Assessor ID	AX45-0001
Client						

SAP 10 WORKSHEET FOR New Build (As Designed) (Version 10.2, February 2022)
CALCULATION OF DWELLING EMISSIONS FOR REGULATIONS COMPLIANCE

1. Overall dwelling characteristics

	Area (m ²)	Storey height (m)	Volume (m ³)
Main dwelling			
Ground floor	108.9800 (1b)	x 2.4000 (2b)	= 261.5520 (1b) - (3b)
First floor	94.9800 (1c)	x 2.6000 (2c)	= 246.9480 (1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	203.9600		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 508.5000 (5)

2. Ventilation rate

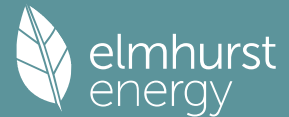
	m ³ per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
Number of blocked chimneys	0 * 20 = 0.0000 (6f)
Number of intermittent extract fans	5 * 10 = 50.0000 (7a)
Number of passive vents	0 * 10 = 0.0000 (7b)
Number of flueless gas fires	0 * 40 = 0.0000 (7c)
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	Air changes per hour 50.0000 / (5) = 0.0983 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	5.0000 (17)
Infiltration rate	0.3483 (18)
Number of sides sheltered	1 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] = 0.9250 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) = 0.3222 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000 (22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750 (22a)
Adj infilt rate	0.4108	0.4028	0.3947	0.3544	0.3464	0.3061	0.3061	0.2980	0.3222	0.3464	0.3625	0.3786 (22b)
Effective ac	0.5844	0.5811	0.5779	0.5628	0.5600	0.5468	0.5468	0.5444	0.5519	0.5600	0.5657	0.5717 (25)

3. Heat losses and heat loss parameter

Element	Gross m ²	Openings m ²	NetArea m ²	U-value W/m ² K	A x U W/K	K-value kJ/m ² K	A x K kJ/K
Main dwelling							
Solid door			2.1000	1.0000	2.1000		(26)
Half glazed			1.8900	1.2000	2.2680		(26a)
Glazing			51.8700	1.3258	68.7670		(27)
Ground floor			108.9800	0.1300	14.1674	110.0000	11987.8000 (28a)
External Wall	240.6500	55.8600	184.7900	0.1600	29.5664	110.0000	20326.9000 (29a)
Dormer cheeks	1.5000		1.5000	0.1600	0.2400	9.0000	13.5000 (29a)
External Roof gf	14.0000		14.0000	0.1100	1.5400	9.0000	126.0000 (30)
Sloping ceiling	14.4000		14.4000	0.1300	1.8720	9.0000	129.6000 (30)
Main roof	80.5800		80.5800	0.1100	8.8638	9.0000	725.2200 (30)
Total net area of external elements A _{um} (A, m ²)			460.1100				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	129.3846		(33)
Main dwelling							
Internal Wallgf			63.8900			75.0000	4791.7500 (32c)
Internal Wall ff			149.5200			9.0000	1345.6800 (32c)
Internal Floor 1			94.9800			18.0000	1709.6400 (32d)
Internal Ceiling 1			94.9800			9.0000	854.8200 (32e)
Heat capacity C _m = Sum(A x k)						(28)...(30) + (32) + (32a)...(32e) =	42010.9100 (34)
Thermal mass parameter (TMP = C _m / TFA) in kJ/m ² K							205.9762 (35)

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List of Thermal Bridges

	Length	Psi-value	Total
K1 Element			
E2 Other lintels (including other steel lintels)	35.3100	0.0280	0.9887
E3 Sill	33.4100	0.0240	0.8018
E4 Jamb	72.6000	0.0190	1.3794
E5 Ground floor (normal)	51.2700	0.0410	2.1021
E6 Intermediate floor within a dwelling	45.2300	0.0000	0.0000
E16 Corner (normal)	29.8000	0.0370	1.1026
E17 Corner (inverted - internal area greater than external area)	9.8000	-0.0790	-0.7742
E10 Eaves (insulation at ceiling level)	4.8200	0.0510	0.2458
E12 Gable (insulation at ceiling level)	26.2300	0.0290	0.7607
E13 Gable (insulation at rafter level)	2.1400	0.0280	0.0599
E11 Eaves (insulation at rafter level)	20.0300	0.0170	0.3405
Thermal bridges (Sum(L x Psi) calculated using Appendix K)			7.0073 (36)
Point Thermal bridges			0.0000
Total fabric heat loss		(33) + (36) + (36a) =	136.3920 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	98.0623	97.5124	96.9735	94.4420	93.9684	91.7636	91.7636	91.3553	92.6129	93.9684	94.9266	95.9282	(38)
Heat transfer coeff	234.4542	233.9044	233.3654	230.8340	230.3604	228.1556	228.1556	227.7473	229.0048	230.3604	231.3185	232.3202	(39)
Average = Sum(39)m / 12 =												230.8317	
HLP	1.1495	1.1468	1.1442	1.1318	1.1294	1.1186	1.1186	1.1166	1.1228	1.1294	1.1341	1.1390	(40)
HLP (average)												1.1317	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy													3.0071 (42)
Hot water usage for mixer showers	83.9684	82.7065	80.8677	77.3495	74.7531	71.8577	70.2119	72.0368	74.0372	77.1460	80.7398	83.6467	(42a)
Hot water usage for baths	32.2203	31.7417	31.0679	29.8254	28.8951	27.8635	27.3063	27.9754	28.7040	29.8078	31.0759	32.1113	(42b)
Hot water usage for other uses	45.4254	43.7736	42.1218	40.4699	38.8181	37.1663	37.1663	38.8181	40.4699	42.1218	43.7736	45.4254	(42c)
Average daily hot water use (litres/day)												148.5851	(43)
Daily hot water use	161.6141	158.2218	154.0573	147.6448	142.4663	136.8874	134.6844	138.8303	143.2111	149.0756	155.5893	161.1834	(44)
Energy conte	255.9572	225.3058	236.7804	202.1184	191.7870	168.3190	162.8891	171.9009	176.5936	202.2942	221.6655	252.3743	(45)
Energy content (annual)										Total = Sum(45)m =		2467.9855	
Distribution loss (46)m = 0.15 x (45)m	38.3936	33.7959	35.5171	30.3178	28.7681	25.2479	24.4334	25.7851	26.4890	30.3441	33.2498	37.8561	(46)
Water storage loss:													
Store volume												200.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												1.5900	(48)
Temperature factor from Table 2b												0.5400	(49)
Enter (49) or (54) in (55)												0.8586	(55)
Total storage loss	26.6166	24.0408	26.6166	25.7580	26.6166	25.7580	26.6166	26.6166	25.7580	26.6166	25.7580	26.6166	(56)
If cylinder contains dedicated solar storage	26.6166	24.0408	26.6166	25.7580	26.6166	25.7580	26.6166	26.6166	25.7580	26.6166	25.7580	26.6166	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month	282.5738	249.3466	263.3970	227.8764	218.4036	194.0770	189.5057	198.5175	202.3516	228.9108	247.4235	278.9909	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h	282.5738	249.3466	263.3970	227.8764	218.4036	194.0770	189.5057	198.5175	202.3516	228.9108	247.4235	278.9909	(64)
12Total per year (kWh/year)										Total per year (kWh/year) = Sum(64)m =		2781.3745	(64)
Electric shower(s)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
												0.0000	(64a)
Heat gains from water heating, kWh/month	85.1058	74.9142	78.7295	67.2044	63.7692	55.9661	54.1606	57.1570	58.7174	67.2628	73.7038	83.9145	(65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts													
(66)m	150.3536	150.3536	150.3536	150.3536	150.3536	150.3536	150.3536	150.3536	150.3536	150.3536	150.3536	150.3536	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	189.0403	209.2946	189.0403	195.3416	189.0403	195.3416	189.0403	189.0403	195.3416	189.0403	195.3416	189.0403	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	374.7935	378.6826	368.8820	348.0177	321.6802	296.9266	280.3898	276.5006	286.3012	307.1655	333.5030	358.2566	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	38.0354	38.0354	38.0354	38.0354	38.0354	38.0354	38.0354	38.0354	38.0354	38.0354	38.0354	38.0354	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)	-120.2829	-120.2829	-120.2829	-120.2829	-120.2829	-120.2829	-120.2829	-120.2829	-120.2829	-120.2829	-120.2829	-120.2829	(71)
Water heating gains (Table 5)	114.3895	111.4794	105.8192	93.3394	85.7113	77.7307	72.7966	76.8240	81.5519	90.4070	102.3664	112.7882	(72)
Total internal gains	746.3293	767.5627	731.8476	704.8047	664.5378	638.1050	610.3327	610.4709	631.3008	654.7189	699.3171	728.1912	(73)

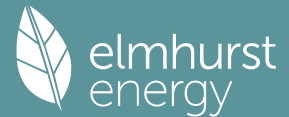
6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W
Northeast	25.2900	11.2829	0.6300	0.7000	0.7700	87.2053 (75)
Southeast	10.1000	36.7938	0.6300	0.7000	0.7700	113.5712 (77)

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energy

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Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	286.6054	
Water heating fuel used	970.4542	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
Total electricity for the above, kWh/year	0.0000	(231)
Electricity for lighting (calculated in Appendix L)	356.5596	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	0.0000	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	4126.8313	(238)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year
Space heating - main system 1	2799.8175	0.1560	436.8238 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	970.4542	0.1413	137.0818 (264)
Space and water heating			573.9056 (265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000 (267)
Energy for lighting	356.5596	0.1443	51.4626 (268)
Total CO2, kg/year			625.3681 (272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			3.0700 (273)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year
Space heating - main system 1	2799.8175	1.5776	4416.9271 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	970.4542	1.5223	1477.3501 (278)
Space and water heating			5894.2772 (279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000 (281)
Energy for lighting	356.5596	1.5338	546.9030 (282)
Total Primary energy kWh/year			6441.1802 (286)
Dwelling Primary energy Rate (DPER)			31.5800 (287)

SAP 10 WORKSHEET FOR New Build (As Designed) (Version 10.2, February 2022) CALCULATION OF TARGET EMISSIONS

1. Overall dwelling characteristics

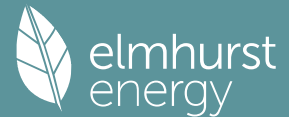
	Area (m2)	Storey height (m)	Volume (m3)
Main dwelling			
Ground floor	108.9800 (1b)	x 2.4000 (2b)	= 261.5520 (1b) - (3b)
First floor	94.9800 (1c)	x 2.6000 (2c)	= 246.9480 (1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	203.9600		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	508.5000 (5)

2. Ventilation rate

	m3 per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
Number of blocked chimneys	0 * 20 = 0.0000 (6f)
Number of intermittent extract fans	4 * 10 = 40.0000 (7a)
Number of passive vents	0 * 10 = 0.0000 (7b)
Number of flueless gas fires	0 * 40 = 0.0000 (7c)
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	40.0000 / (5) = 0.0787 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	5.0000 (17)
Infiltration rate	0.3287 (18)
Number of sides sheltered	1 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] = 0.9250 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) = 0.3040 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000 (22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750 (22a)
Adj infilt rate	0.3876	0.3800	0.3724	0.3344	0.3268	0.2888	0.2888	0.2812	0.3040	0.3268	0.3420	0.3572 (22b)
Effective ac	0.5751	0.5722	0.5693	0.5559	0.5534	0.5417	0.5417	0.5395	0.5462	0.5534	0.5585	0.5638 (25)

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3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
TER Opaque door			2.1000	1.0000	2.1000			(26)
TER Semi-glazed door			1.8900	1.0000	1.8900			(26a)
TER Opening Type			47.0000	1.1450	53.8168			(27)
Ground floor			108.9800	0.1300	14.1674			(28a)
External Wall	240.6500	50.9900	189.6600	0.1800	34.1388			(29a)
Dormer cheeks	1.5000		1.5000	0.1800	0.2700			(29a)
External Roof gf	14.0000		14.0000	0.1100	1.5400			(30)
Sloping ceiling	14.4000		14.4000	0.1100	1.5840			(30)
Main roof	80.5800		80.5800	0.1100	8.8638			(30)
Total net area of external elements Aum(A, m2)			460.1100					(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) =	118.3708		(33)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K

205.9762 (35)

List of Thermal Bridges

K1 Element	Length	Psi-value	Total
E2 Other lintels (including other steel lintels)	35.3100	0.0500	1.7655
E3 Sill	33.4100	0.0500	1.6705
E4 Jamb	72.6000	0.0500	3.6300
E5 Ground floor (normal)	51.2700	0.1600	8.2032
E6 Intermediate floor within a dwelling	45.2300	0.0000	0.0000
E16 Corner (normal)	29.8000	0.0900	2.6820
E17 Corner (inverted - internal area greater than external area)	9.8000	-0.0900	-0.8820
E10 Eaves (insulation at ceiling level)	4.8200	0.0600	0.2892
E12 Gable (insulation at ceiling level)	26.2300	0.0600	1.5738
E13 Gable (insulation at rafter level)	2.1400	0.0800	0.1712
E11 Eaves (insulation at rafter level)	20.0300	0.0400	0.8012
Thermal bridges (Sum(L x Psi) calculated using Appendix K)			19.9046 (36)
Point Thermal bridges			(36a) = 0.0000
Total fabric heat loss			(33) + (36) + (36a) = 138.2754 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

(38)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Heat transfer coeff	96.5086	96.0191	95.5392	93.2856	92.8639	90.9010	90.9010	90.5375	91.6571	92.8639	93.7169	94.6087	(38)
Average = Sum(39)m / 12 =	234.7840	234.2945	233.8146	231.5610	231.1393	229.1764	229.1764	228.8129	229.9325	231.1393	231.9923	232.8841	(39)
												231.5589	

HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP (average)	1.1511	1.1487	1.1464	1.1353	1.1333	1.1236	1.1236	1.1219	1.1273	1.1333	1.1374	1.1418	(40)
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

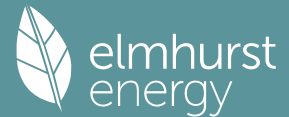
4. Water heating energy requirements (kWh/year)

Assumed occupancy													3.0071 (42)
Hot water usage for mixer showers													
Hot water usage for baths	74.6386	73.5169	71.8824	68.7551	66.4472	63.8735	62.4106	64.0327	65.8109	68.5743	71.7687	74.3526	(42a)
Hot water usage for other uses	32.2203	31.7417	31.0679	29.8254	28.8951	27.8635	27.3063	27.9754	28.7040	29.8078	31.0759	32.1113	(42b)
Average daily hot water use (litres/day)	45.4254	43.7736	42.1218	40.4699	38.8181	37.1663	37.1663	38.8181	40.4699	42.1218	43.7736	45.4254	(42c)
												139.9834	(43)
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Energy conte	152.2843	149.0322	145.0720	139.0504	134.1604	128.9032	126.8831	130.8262	134.9848	140.5038	146.6182	151.8894	(44)
Energy content (annual)	241.1810	212.2199	222.9703	190.3531	180.6057	158.5016	153.4541	161.9902	166.4497	190.6624	208.8845	237.8220	(45)
Distribution loss (46)m = 0.15 x (45)m													
Water storage loss:	36.1772	31.8330	33.4456	28.5530	27.0909	23.7752	23.0181	24.2985	24.9675	28.5994	31.3327	35.6733	(46)
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												1.3938	(48)
Temperature factor from Table 2b												0.5400	(49)
Enter (49) or (54) in (55)												0.7527	(55)
Total storage loss	23.3325	21.0745	23.3325	22.5798	23.3325	22.5798	23.3325	23.3325	22.5798	23.3325	22.5798	23.3325	(56)
If cylinder contains dedicated solar storage													
Primary loss	23.3325	21.0745	23.3325	22.5798	23.3325	22.5798	23.3325	23.3325	22.5798	23.3325	22.5798	23.3325	(57)
Combi loss	23.2624	21.0112	23.2624	22.5120	23.2624	22.5120	23.2624	23.2624	22.5120	23.2624	22.5120	23.2624	(59)
Total heat required for water heating calculated for each month	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
WWHRS	287.7759	254.3056	269.5652	235.4449	227.2006	203.5934	200.0490	208.5851	211.5415	237.2573	253.9764	284.4169	(62)
PV diverter	-34.1216	-30.1775	-31.6001	-26.1661	-24.3859	-20.8672	-19.5597	-20.7997	-21.5900	-25.4522	-28.8343	-33.4898	(63a)
Solar input	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	(63b)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
Output from w/h	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Total per year (kWh/year)	253.6543	224.1282	237.9651	209.2788	202.8147	182.7262	180.4894	187.7853	189.9516	211.8051	225.1421	250.9272	(64)
Electric shower(s)												2556.6679	(64)
Heat gains from water heating, kWh/month	117.4686	104.2317	111.4136	99.3659	97.3273	88.7752	88.2994	91.1377	91.4180	100.6712	105.5276	116.3517	(65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts													
(66)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	150.3536	150.3536	150.3536	150.3536	150.3536	150.3536	150.3536	150.3536	150.3536	150.3536	150.3536	150.3536	(66)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	189.0403	209.2946	189.0403	195.3416	189.0403	195.3416	189.0403	189.0403	195.3416	189.0403	195.3416	189.0403	(67)
	374.7935	378.6826	368.8820	348.0177	321.6802	296.9266	280.3898	276.5006	286.3012	307.1655	333.5030	358.2566	(68)

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Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	38.0354	38.0354	38.0354	38.0354	38.0354	38.0354	38.0354	38.0354	38.0354	38.0354	38.0354	38.0354 (69)
Pumps, fans	3.0000	3.0000	3.0000	3.0000	3.0000	0.0000	0.0000	0.0000	0.0000	3.0000	3.0000	3.0000 (70)
Losses e.g. evaporation (negative values) (Table 5)	-120.2829	-120.2829	-120.2829	-120.2829	-120.2829	-120.2829	-120.2829	-120.2829	-120.2829	-120.2829	-120.2829	-120.2829 (71)
Water heating gains (Table 5)	157.8879	155.1067	149.7494	138.0082	130.8163	123.2989	118.6820	122.4968	126.9694	135.3107	146.5661	156.3868 (72)
Total internal gains	792.8277	814.1900	778.7778	752.4735	712.6428	683.6733	656.2181	656.1438	676.7183	702.6226	746.5168	774.7897 (73)

6. Solar gains

[Jan]				Area m2	Solar flux Table 6a W/m2		g Specific data or Table 6b	FF Specific data or Table 6c		Access factor Table 6d		Gains W
Northeast				22.9100	11.2829		0.6300	0.7000		0.7700		78.9986 (75)
Southeast				9.1600	36.7938		0.6300	0.7000		0.7700		103.0012 (77)
Southwest				12.7200	36.7938		0.6300	0.7000		0.7700		143.0322 (79)
Northwest				2.2100	11.2829		0.6300	0.7000		0.7700		7.6206 (81)
Solar gains	332.6526	595.4017	891.0766	1232.1819	1497.0654	1537.6682	1461.0739	1255.5964	1007.9633	678.6511	403.6807	281.2909 (83)
Total gains	1125.4803	1409.5917	1669.8544	1984.6554	2209.7082	2221.3415	2117.2921	1911.7402	1684.6816	1381.2737	1150.1974	1056.0806 (84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000 (85)
Utilisation factor for gains for living area, nil,m (see Table 9a)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
tau	49.7040	49.8078	49.9100	50.3958	50.4877	50.9201	50.9201	51.0010	50.7527	50.4877	50.3021	50.1095
alpha	4.3136	4.3205	4.3273	4.3597	4.3658	4.3947	4.3947	4.4001	4.3835	4.3658	4.3535	4.3406
util living area	0.9967	0.9910	0.9758	0.9230	0.8022	0.6198	0.4665	0.5319	0.7890	0.9601	0.9927	0.9975 (86)
MIT	19.2913	19.5494	19.9240	20.4059	20.7691	20.9447	20.9873	20.9781	20.8421	20.3396	19.7249	19.2513 (87)
Th 2	19.9593	19.9612	19.9631	19.9721	19.9738	19.9816	19.9816	19.9830	19.9786	19.9738	19.9704	19.9668 (88)
util rest of house	0.9958	0.9885	0.9687	0.9009	0.7506	0.5358	0.3632	0.4229	0.7154	0.9442	0.9903	0.9968 (89)
MIT 2	17.9573	18.2878	18.7633	19.3623	19.7742	19.9476	19.9769	19.9740	19.8632	19.2957	18.5196	17.9112 (90)
Living area fraction	18.1277	18.4488	18.9115	19.4955	19.9012	20.0749	20.1059	20.1022	19.9882	19.4290	18.6735	18.0823 (92)
MIT	18.1277	18.4488	18.9115	19.4955	19.9012	20.0749	20.1059	20.1022	19.9882	19.4290	18.6735	18.0823 (93)
Temperature adjustment												0.0000
adjusted MIT	18.1277	18.4488	18.9115	19.4955	19.9012	20.0749	20.1059	20.1022	19.9882	19.4290	18.6735	18.0823 (93)

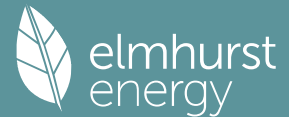
8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	0.9932	0.9831	0.9590	0.8884	0.7465	0.5439	0.3761	0.4362	0.7161	0.9329	0.9856	0.9947 (94)
Useful gains	1117.8343	1385.7872	1601.3852	1763.1160	1649.5789	1208.2239	796.3758	833.8211	1206.4773	1288.6491	1133.6111	1050.5355 (95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000 (96)
Heat loss rate W	3246.5108	3174.4183	2901.9847	2453.5138	1895.6254	1254.7192	803.4672	847.1178	1353.8880	2040.7222	2684.9521	3232.9701 (97)
Space heating kWh	1583.7354	1201.9602	967.6460	497.0864	183.0586	0.0000	0.0000	0.0000	0.0000	559.5424	1116.9655	1623.7313 (98a)
Space heating requirement - total per year (kWh/year)												7733.7259
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (98b)
Solar heating contribution - total per year (kWh/year)												0.0000
Space heating kWh	1583.7354	1201.9602	967.6460	497.0864	183.0586	0.0000	0.0000	0.0000	0.0000	559.5424	1116.9655	1623.7313 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												7733.7259
Space heating per m2										(98c) / (4) =		37.9179 (99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)												0.0000 (201)
Fraction of space heat from main system(s)												1.0000 (202)
Efficiency of main space heating system 1 (in %)												92.3000 (206)
Efficiency of main space heating system 2 (in %)												0.0000 (207)
Efficiency of secondary/supplementary heating system, %												0.0000 (208)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Space heating requirement	1583.7354	1201.9602	967.6460	497.0864	183.0586	0.0000	0.0000	0.0000	0.0000	559.5424	1116.9655	1623.7313 (98)
Space heating efficiency (main heating system 1)	92.3000	92.3000	92.3000	92.3000	92.3000	0.0000	0.0000	0.0000	0.0000	92.3000	92.3000	92.3000 (210)
Space heating fuel (main heating system)	1715.8563	1302.2320	1048.3706	538.5552	198.3300	0.0000	0.0000	0.0000	0.0000	606.2215	1210.1469	1759.1889 (211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (215)
Water heating												
Water heating requirement	253.6543	224.1282	237.9651	209.2788	202.8147	182.7262	180.4894	187.7853	189.9516	211.8051	225.1421	250.9272 (64)
Efficiency of water heater												79.8000 (216)
(217)m	87.4386	87.2534	86.8663	85.9287	83.8307	79.8000	79.8000	79.8000	79.8000	86.1326	87.1511	87.4794 (217)
Fuel for water heating, kWh/month	290.0942	256.8704	273.9443	243.5493	241.9337	228.9802	226.1772	235.3200	238.0345	245.9059	258.3352	286.8414 (219)
Space cooling fuel requirement												
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (221)
Pumps and Fa	7.3041	6.5973	7.3041	7.0685	7.3041	7.0685	7.3041	7.3041	7.0685	7.3041	7.0685	7.3041 (231)
Lighting	39.2788	31.5109	28.3721	20.7866	16.0562	13.1180	14.6470	19.0387	24.7294	32.4463	36.6480	40.3705 (232)
Electricity generated by PVs (Appendix M) (negative quantity)												

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(233a)m	-88.9771	-119.3649	-163.2902	-174.3227	-180.3308	-165.4128	-163.0610	-157.3712	-146.6553	-131.5978	-95.4936	-77.6305	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	-70.5911	-145.5704	-284.2242	-419.8395	-548.6740	-549.2053	-543.0082	-462.9190	-343.3825	-206.0959	-93.5165	-56.0749	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)
Annual totals kWh/year													
Space heating fuel - main system 1												8378.9013	(211)
Space heating fuel - main system 2												0.0000	(213)
Space heating fuel - secondary												0.0000	(215)
Efficiency of water heater												79.8000	
Water heating fuel used												3025.9862	(219)
Space cooling fuel												0.0000	(221)
Electricity for pumps and fans:													
Total electricity for the above, kWh/year												86.0000	(231)
Electricity for lighting (calculated in Appendix L)												317.0027	(232)
Energy saving/generation technologies (Appendices M ,N and Q)													
PV generation												-5386.6095	(233)
Wind generation												0.0000	(234)
Hydro-electric generation (Appendix N)												0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)												0.0000	(235)
Appendix Q - special features													
Energy saved or generated												-0.0000	(236)
Energy used												0.0000	(237)
Total delivered energy for all uses												6421.2806	(238)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year
Space heating - main system 1	8378.9013	0.2100	1759.5693 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	3025.9862	0.2100	635.4571 (264)
Space and water heating			2395.0264 (265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293 (267)
Energy for lighting	317.0027	0.1443	45.7533 (268)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-1663.5080	0.1357	-225.7543
PV Unit electricity exported	-3723.1015	0.1264	-470.5362
Total			-696.2905 (269)
Total CO2, kg/year			1756.4184 (272)
EPC Target Carbon Dioxide Emission Rate (TER)			8.6100 (273)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year
Space heating - main system 1	8378.9013	1.1300	9468.1585 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	3025.9862	1.1300	3419.3644 (278)
Space and water heating			12887.5229 (279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008 (281)
Energy for lighting	317.0027	1.5338	486.2293 (282)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-1663.5080	1.5016	-2497.9607
PV Unit electricity exported	-3723.1015	0.4639	-1727.2690
Total			-4225.2298 (283)
Total Primary energy kWh/year			9278.6232 (286)
Target Primary Energy Rate (TPER)			45.4900 (287)